

males, and one *O. wojcickyi* male emerged in the laboratory. Additional males of *O. xena* emerged on 30 May, 1 June, and 2 June 1997.

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#### NOTE

##### First records of the Nymphomyiidae (Diptera) in Nepal

The Nymphomyiidae are one of the most specialized and distinctive families of nematoceros Diptera. These flies usually colonize cool, pristine, headwater streams where all life stages may frequent current-exposed habitats (0.5–1.0 m/s). Larvae are collector-gatherers or grazers, feeding on the thin films of algae, bacteria and other organic matter (= periphyton) on current-exposed rocks. Adults possess wings at emergence, but few details of flight behavior exist. Data for several species suggest that adults mate soon after emergence, crawl beneath the water *in copula*, and the female attaches eggs to the coupled bodies (Courtney 1994, *Smithsonian Contributions to Zoology* 550: 1–41). Adults of at least some species die *in copula*. In fact, *N. walkeri* (Ide) was for several years known only from “apterous” (i.e. dealate) adults, most as copulating pairs (e.g. Ide 1965. *The Canadian Entomologist* 97: 496–507; Cutten and Kevan 1970. *Canadian Journal of Zoology* 48: 1–24; Mingo and Gibbs 1976. *Entomological News* 87: 184–185). It is now assumed that the wingless condition is related to oviposition behavior. The vestigial mouthparts and poorly developed digestive tract suggest an ephemeral adult life,

but adults of some species can survive several days in the laboratory (Courtney 1994).

The phylogenetic position of the Nymphomyiidae is among the more controversial issues in dipterology. The family was considered by many workers to be the most primitive group of Diptera (e.g. Rohdendorf 1974. *The Historical Development of Diptera*. [translated from Russian]. Hocking, Oldroyd and Ball (editors). University of Alberta Press, Edmonton. 360pp.; Ide 1965, Cutten and Kevan 1970, Hackman and Väisänen 1982. *Annales Zoologici Fennici* 19: 209–219; Griffiths 1990. *Quaestiones Entomologicae* 26: 117–130). Other studies (Courtney 1994) suggest that nymphomyiids are related to the Culicomorpha. Most recent analyses (e.g. Wood and Borkeent 1989. pp. 1333–1370. *In* McAlpine and Wood (coordinators). *Manual of Nearctic Diptera*, Volume 3. Research Branch, Agriculture Canada Monograph 32; Courtney 1990. *Canadian Journal of Zoology* 68: 556–578; Courtney, 1991. *Systematic Entomology* 16: 137–172; Oosterbroek and Courtney 1995. *Zoological Journal of the Linnean Society* 115: 267–311) support the hypothesis that nymphomyiids belong to the infraorder Blephariceromorpha, as sis-

ter-group to the Deuterophlebiidae + Blephariceridae.

The Nymphomyiidae were revised recently (Courtney 1994) to include seven species: three from northeastern Asia (*Nymphomyia alba* Tokunaga, *N. levanidovae* Rohdendorf and Kalugina, and *N. rohden-dorfi* Makarchenko), two from eastern North America (*N. dolichopeza* Courtney and *N. walkeri* (Ide)), and one each from Hong Kong (*N. holoptica* Courtney) and the Himalayas (*N. brundini* (Kevan)). Previous records from the Himalayas were limited to five pupal exuviae and two adult males (see Courtney [1994] for a re-interpretation of Cutten and Kevan's [1970] "female" specimen). All were collected November, 1961, in Darjeeling District, India (Brundin 1966. *Kungliga Svenska Vetenskapsakademiens Handlingar* 11: 1-472). This note reports on the first collections of Himalayan Nymphomyiidae in over 30 years, the first records of the family in Nepal, and the discovery of larvae that appear to be *N. brundini*.

As part of an ongoing study of the mosquito fauna of Nepal (see Darsie, Courtney and Pradhan, 1996. *Journal of the American Mosquito Control Association* 12: 130-134), a survey of the "Midwestern Region" was conducted in 1994. The survey included nearly three months of field work, one in Himalayan foothill zone around Jumla (29°16'N 82°11'E, 2340m). While based in Jumla, a one-week trek to Rara Lake National Park provided opportunities to sample aquatic habitats for mosquitoes and other insects. Rock-wash methods (Courtney 1991. *Journal of the North American Benthological Society* 10: 177-197; Courtney 1994) were used to gather benthic samples at several streams between Jumla and Rara Lake, in hopes of collecting nymphomyiids and early instar larvae of other torrenticolous insects. Using these methods, nymphomyiids were collected at two streams, Chauta Khola and Ghatta Khola. Both are tributaries of the Sinja Khola, in the northern part of Jumla District approximately 25

km NNW of Jumla. Nymphomyiid collection data were as follows: NEPAL, Jumla District, Chauta Khola above Chauta, 29°26'N 82°06'E, 2780m, 14 September 1994, coll. G.W. Courtney (1 ♂ pupa and 25 larvae—6, 1, 10, 8 of instars I-IV, respectively); Ghatta Khola below Gorasina, 29°26'N 82°02'E, 3100m, 17 September 1994, coll. G.W. Courtney (1 larva—instar I). Voucher specimens are deposited in the National Museum of Natural History, Smithsonian Institution, Washington, DC, and the Iowa State Insect Collection, Ames, IA.

Both Chauta Khola and Ghatta Khola are cool, small (approx. 5m wide), mountain streams flowing through mixed conifer-deciduous forest. The headwaters of both sites are dominated by open meadows; however, nymphomyiid collections were from reaches where riparian forest and herbaceous cover were well developed, especially at Chauta Khola. The latter site could be categorized as "torrential," and was dominated by large substrates and extensive whitewater areas. As is typical of many nymphomyiid sites in eastern North America, both Nepal sites contained many rocks covered with aquatic moss. Moss-covered substrates were the source of nymphomyiid material. Although sampled during the monsoon and after several days with periodical rains, both streams were clear and approximately 7°C. At Chauta Khola, nymphomyiids were sympatric with larvae of *Deuterophlebia* sp. and larvae and pupae of *Blepharicera* sp.

Nymphomyiids from Chauta Khola appear to be conspecific with the Indian species *N. brundini*. The male pupa and adult genitalia (dissected from the pupa) closely match the description of *N. brundini* (see Courtney 1994), and the larval postmentum is similar to that of several species not easily separated (including *N. brundini*'s sister-species, *N. holoptica*). Assuming the Chauta Khola larvae and pupa are conspecific, the larval records are the first for *N. brundini*. The lack of associated life stages

makes me less confident about the identity of the Ghatta Khola instar-I larva. However, Ghatta Khola and Chauta Khola are tributaries of the same major river (Sinja Khola) and separated by only about 5km. The proximity of these sites and the general lack of sympatry in the family (Courtney 1994) suggest that the Ghatta Khola and Chauta Khola nymphomyiids are conspecific. Females of *N. brundini* remain unknown.

These records extend the known distribution of *N. brundini* nearly 700km westward. The lack of records from intervening areas presumably reflects the lack of collection, rather than the absence of nymphomyiids. Additional records and new species of nymphomyiids are expected in other parts of the Himalayas and southeast Asia. However, as recommended elsewhere

(Courtney 1994), the key to future discoveries will be to adopt rock-wash and other collection methods that effectively sample the habitats of these unusual flies.

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